COMPLETE IN THIRTY VOLUMES

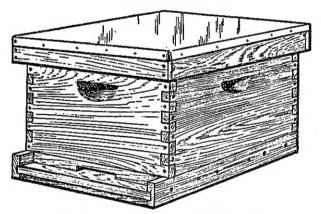
1829



1954

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Diseases of Brood.—There are two diseases that attack the brood of honeybees; one is known as American, and the other as European foul brood. The American foul brood is the more serious, so serious that no cure can be safely applied. The bee-keeper who finds it in his hives should burn the combs, bees and all, and scorch out the inside of the hive with a blow torch before it is used again. The second disease known as European foul brood, can be cured by building up the strength of the colony, introducing a queen of vigorous, Italian strain. The building-up consists of giving frames of emerging brood so that the strength of the colony will be rapidly increased. For further particulars, send to the Bureau of Entomology, Bee Culture Laboratory, Washington, D.C. Treatment and cure will be described for both diseases, except that in the case of American foul brood, complete destruction of bees is recommended.



Modern hive of "Langstroth" dimensions.

Enemies of Bees.—A number of insects, birds, and mammals must be classed as enemies of bees, but of these the larger wax moth, the lesser wax moth, and ants are the only ones of importance. Moth larvae often destroy combs. To prevent this the combs are fumigated with paradichlorobenzene or bisulphide of carbon in tiers of hives or in tight rooms. In warm climates ants are a serious pest. The usual method of keeping them out is to put the hive on a stand, the legs of which rest in vessels containing oil or creosote.

BEE LARKSPUR. A well-known flower ing plant, Delphinium elatum, having a flower resembling a bee.

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BEE LOUSE (Braula coeca), is a parasite on the honeybee, occurring on the thorax especially of the queen bee—rarely on the drones. Frank Benton, American apiculturist, states that he at one time removed as many as 75 from a queen, though the numbers do not generally exceed a dozen. The bee louse is about one-twentieth of an inch in length, entirely without wings, and somewhat spiderlike in appearance. On the day the maggot or larva hatches from the egg it sheds its skin and turns to an oval puparium of a dark-brown color. It has frequently been imported to the United States on queens with attendant bees but has gained no foothold.

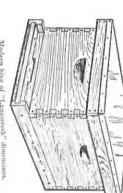
BEE MARTIN, the kingbird, a flycatcher which occasionally eats bees. See KINGBIRD.

BEE MOTH, a moth belonging to the family Galleridae; specifically, Galleria mellonella, the larva of which feeds on wax in hives. The worm is yellowish-white with brownish dots. It constructs silken galleries running through the comb of the beehive on which it feeds. When about to transform it spins a thick white cocoon. Two broods of the moth appear, one in the spring, the other in August, and the caterpillars mature in about three weeks. It may become a most troublesome pest in the apiary.

BEE ORCHIS, the name of a species of orchis, the Arachnites apifera. It is so called because a part of the flower resembles a bee. It is large, with the sepals purplish or greenishwhite, and the lip brown variegated with yellow.

BEE TREE, a forest tree inhabited by honey-making bees, which have taken possession of some natural hollow and filled it with combs. Such a tree may be found by accident, or by deliberate hunting. Those in search take to the edge of the woods a box of diluted honey, and when they see bees near them, open the bait to which one by one the bees will be attracted. The direction of their flight is then carefully observed; the bait is moved to another point.

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Modern hive of "Langstroth" dimensions

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Author of "ABC & XYZ of Ree Calture". Editor of "Gleanings in Bee Culture."

BEE KILLER, one of the robber flies (qxx), of the dipterons family Asikilac some of which are known to sole with their slarp bancet-shaped beak bumblehees and honeyhees and suck their blood. This species Trapanea afterora, the bee killer, captures the honeyhee while on the wing, and one such if has been known to kill 141 bees in a single day. These flies are sont-bodied, hairy or bristly, with a long abdomen; the mouth parts are much developed and adapted for piercing. The magnots the prosts of plants.

Diseases of Brood.-There are two diseases BEE LARKSPUR. A well-known flowering plant, Delphinium clatum, having a flower resembling a bee.

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ico. Australia, and many European countries.
While best known as an interpreter of great
music he was also a brilliant wit and controversialist. He wrote the autobiographical A Mingled

Chime (1944).

BEECHER, Catharine Esther, American

bioney-making bees, which have taken possession to di some natural hollow and filled it with combs. Such a tree may be found by accident, or by deliberate hunting. Those in search take to the dege of the woods a box of diluted honey, and a when they see hees mear them, open the bait to which one by one the bees will be attracted. The direction of their flight is then cartfully observed; the bait is moved to another point, had now observations taken, and the converging lines followed until they intersect at the tree. As most of these bee-tree colonies are escaped warms the capture of the bees themselves is more important than merely to get such honey as more important than merely to get such honey as more important than merely to get such boney as more important than merely to get such boney as more important than merely to get such boney as more insportant than the heast and gather the combs and contents to be fet down in a pail or basket or else saw out the whole section of the tree containing the nest and lower it to the ground. Full directions for this complicated as proceeding are given by Root, E. R., ABC and e. NIZ of Rec Culture (Ohio 1950).

BEEBE, he'be, (Charles) William, American scientist, explorer, and author: b. Brocklyn. W. Y., July 29, 1877. He was graduated from Columbia University in 1898, and since 1899 has been honorary curator of ornithology, New York a Zoological Society; also director of the Department of Scientific Research. He is credited with having made the collection of living birds at the New York Zoological Gardens one of the finest.

Led numerous scientific expeditions to Canada, South America, and other parts of the leaves of the l J. Joseph Mexico (1905); Jungle Peace J. Joseph Mexico (1905); Jungle 1925); Galapagos, World's End (1925); Jungle 1925); The Arctivuts Adventure (1925); Season Jungles (1927); Beneath Tropic Season Mexico, Land of Water (1932); Field J. Nensuch, Land of Water (1932); Field of the Shore Fishes of Bermuda (with J. Jan. 1933); Half Mile Davos (1934); Zaca (1938); Book of Bays (1942); High a conductor: b. St. Helen's, Lancashire, April 29, a 1879. The grandson of the inventor of Beecham's Pills, in 1916 he inherited the baronetry conferred upon his father, Joseph Beecham. He was eduted the his father, Joseph Beecham. He was eduted the Kossall School and Wadham College. Oxford University, and, with precocious musical aggeins, he conducted the Hallé Orchestra, of Manchester, at the age of 19. In 1905 he made his first appearance in London, with the Queen's Hall Orchestra; and the next year, after writing two operas and learning to play the trombone, he foamded the New Symphony Orchestra. During the succeeding 40 years he was to found five more orchestras, among them the London Philestranetic and the Royal Phillarmente. He popularized the music of Frederick Defins in Britain to be a price of the Russian Sale of Sergel Diaglilee and on to the Russian ballet of Sergel Diaglilee and to the Russian ballet of Sergel Diaglilee and to the Russian ballet of Sergel Diaglilee and to the Russian Derea Company. His interpretations of Wagner and Mozart were considered by some crities to be unrivaled, and he resurrected much 1981-century music that had long lain neglected. He made his first visit to the United States in 1928, when he conducted the New York etc. BEECH GROVE, town. Ind., in Marion County, 7 miles southeast of Indianapolis. It is a suburb of that city. Pop. (1950) 5,685.

be European species has produced a large mather of varieties, of which the copper or purde heach is probably the best known in America. It is a particular to the matter of eastern Asia, is sometimes planted for ornament. If, betuloidis, a large different production of the several to winter landscape on account of its everal to winter landscape on account of the very large to the winter landscape on account of the ornament to the braken lands and elsewhere for roofing. Blue a mater beeth, better known as American horse to water beeth, better known as American horse. behing and twisting are not expected. The wood was not durable in contact with soil, but since it is romarkably lasting when immersed in water, it is ramarkably lasting when immersed in water, it is harvely used in dams, water-mills, and sluices. He wood of the European species is preferred that of all other species, except walnut, for which shoes (salots), in France, since it is remarkably resistant to the entrance of water. It bark is sometimes used in tanning. Both the same used in ornamental planting on account of their symmetrical forms, the colors of water hark and foliance, which latter is remarkably researched a trace which latter is remarkable to the produced a large BEECH, a small genus (Fagus) of handicest trees of the family Faguscae. The
merican beech (Fagus grandipidia), and the
merican or common beech (F. sylvatica), are
also similar. They often attain begitts exalso so feet, and diameters greater than three
take by feet, and diameters granter than three
take half feet. The former has smooth lightbark, a broad round head, and leaves which
the pellow before they hall in the autumn; the the has darl-gray bark, and has shining leaves whe has darl-gray bark, and has shining leaves whe persist during most of the winter. The wear-gray hears fruit before the 50th year of the sea, and then not every year. After the 140th are, the woodrings become thinner. The tree as for about 50 years. Some stens are fluted, and even twisted. The roots stretch far away, at the surface of the soil, partly above it, and beeches are useful for live hedges, as they are prunning, and as their branches coalesce by are prunning, and as their branches coalesce by a prunning, and as their branches coalesce by a prediction of the soil prickly involucres. These are eaten by swine, deer, and poultry. Both seat thrive in light, limy learns, upon which should be succeeded to the soil of the become the leading species tree, covering large tracts. They do not grow a lamp situations. Their reddish-brown, soild, and be third wood makes excellent fuel, and largely used for making tool handles where No. (Carpinus americana), a common tree, is 2d a member of this genus. See Horneau. From the wood of the beech an especially ture form of creosote is obtained. ed educator and reformer: b. East Hampon, Long Island, N. Y. Sept, 6, 1800; d. Elmira, N. Y. Sept, 1800; d. Sector of Heary Ward Beecher (q.v.), or from 1824 till 1823 she conducted a girl's school with Hartford, Com., and for the next five years of the Ladies of the managed a like school in Cinciunati, Ohio, she managed a like school in Cinciunati, Ohio, She was one of the organizers of the Ladies Society for Promoting Education in the West, which founded schools in Illinois, Wisconsin, and so which founded schools in Illinois, Wisconsin, and is liked her views in Illinois, Wisconsin and is liked her views in Illinois, Wisconsin and is liked her views in Illinois, Wisconsin and Shibid her views in Illinois, Wisconsin and is liked her views in Illinois, Wisconsin and is liked her views in Illinois, Cath Hooks in the Homan Suirage (1871). Earlier books in the of Homan Suirage (1871), and Common Science Applied to Melijanu (1857). She also wrote Educational

BEECHER. Charles, American elergyman:

5. b. Litchield, Com., Oct. 7, 1815: d. Haverhill,

22 Mass., April 21, 1900. After graduating at Power

doin College in 1834, he studied theology at Lane

Seminary under his father. Lyman Beecher (4x).

6. Ordafined in the Presbyterian ministry in 1844,

a he occupied pastorates in Fort Wayne. Ind., New
earls, N. J., and Georgetown. Mass. down to

1870, when he moved to Fortida. In 1885 he

the muster for the Plymonth Collection of hymns,

me and published several relicious books. In 1894

the edited his father's antobiography and cor
terminated the second of the Plymonth respondence.

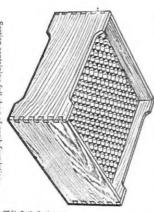
Reminiscences and Suggestions (1874).

BEECHER, Charles Emerson, American paleontologist; b. Dunkirk, N. Y., Oct. 9, 1856;

wax, which is secreted by the bees and used by them for building their combs, is an important vornmercial product and commands a good price in the United States Three to five million pounds are produced there annually. This wax is used for waterprofing, for sacramental candides, and in cosmetics. Frequently there are combs to be melted up, and it pays to take care even of scraps of comb and the cappings taken off in extracting. A common method of taking out the wax is to melt the combs in a glass-covered pan heated by the sun. Various wax presses are on the market, but if much wax is produced, it is advisable that the bec-keeper make a careful study of the methods of wax extraction as usually there is much wax wasted.

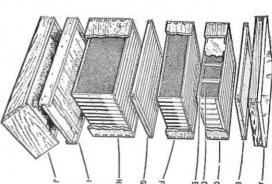
as usually there is much wax wasted.

Comb Honey Production.—Comb honey is usually put up in little square boxes, of which several million are made and used in the United States annually. The honey in these boxes retails from 30 cents to 70 cents. Extracted honey is in the liquid form, thrown from the combs by means of centritugal force in a honey extractor, hence the name. Honey in the comb cannot be adulterated or manufactured, newspaper reports to the contrary. One bec-keeper of considerable standing and prominence has had a standing offer of \$1,000 for a single sample of artificial comb honey so perfect as to deceive the ordinary consumer. Notwithstanding that this offer has been broadly published over the United States for over 50 years, no one has ever claimed the reward. It may be well to explain that a partial basis for these newspaper reports lies in the fact that beckeepers use a commercial product known as comb foundation which is sheeted wax embossed on both sides with indentations having the exact shape and form of the bottom of the cells of honeycomb—hence the name. It is put into the live where the bees draw it out into comb. This is as far as the skill of man can go; bence there is no such thing as artificial comb because.



Section containing full slicer of comb foundation

Producing comb honey requires considerable kill. Hives and supers are so arranged that the little boxes containing strips of comb ioundation shall be accessible to the bees where they can build the foundation into comb, fill the cells with honey and seal them over. When the bees are busily at work in the fields and the combs are beginning to whiten and to be bulged with honey in what is called the brood nest, the honey boxes are put in the upper part of the hive. These are the large of the larg

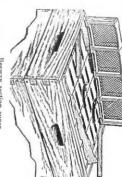


Bee hive for comb honey

A-metal clad cover, telescopes over the supers below cold and cover, telescopes over the supers below cold and cover, helps insulate lees from heat and section and the supersection of the supersection bears. D-this supersection bears and the supersection of these to a live. Surplus honey can be extracted from the conduct of the supersection of the s

Extracted Honey Production.—The business of producing extracted (or liquid) honey requires almost the same intelligent care and attention. Instead of section boxes, however, an extra set of combs is put in the upper story, the same being placed above the lower or broad part of the hive. When these are filled with honey and capped over, they are removed from the hive by first shaking the bees off, or by what is known as a bee-escape board, taken to the extracting house and extracted. The thin film of wax covering the comb is shaved off with a knife specially designed for the purpose. After the comb are uncapped, they are put in the honey extractor and revolved at a high rate of speed. The honey hills out of the comb by centritugal force against the sides of the extractor, when the combs are emptied in a like manner. They are next resturned to the hive to be filled by the bees, when the the process may be repeated as long as the season to be season.

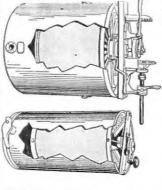
oney flow until they are filled and capped over, when they are removed and others put in their



Beeway section super.

is reached a high state of prosperity and the mbs are being filled with honey, a swarm may me forth between the hours of 9 A.K. and 3 A.M. Most of the bees, including the queen, are city sure to come out with a rush, thousands them being in the air. The bees hover about r 15 or 20 minutes, when they will in all probability cluster on some bush or tree. They will ait here for two or three hours, or perhaps wright, at the end of which time they will see wing again and go direct into some hollow. It was not start housekeeping anew. The young case together with those unharched, with one or ward young queens, are left to take care of the if

ving cappings from a comb.

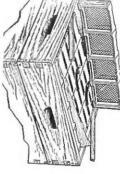


actors: left, right, band

In ordinary practice it is a custom for the telegeper to rehive the swarm by taking the rest as soon as they cluster and putting them no another hive. Or, he may, if he chooses, his the old queen's wings, preventing her flight with the swarm; and when the bees come forth the will crawl out of the entrance to be captured by her owner, and as soon as her subjects return, which they will do to find their royal mother, they are allowed to go into a new hive on the advand, while the old hive is carried to another.

Prevention of Swarming.—Since crowded and overleated hives are conducive to swarming, this tendency is overcome by giving plenty of untilation and additional room in the hive.

Swarming.—At the beginning of or during that is called the honey flow, when the colony Shade is also a good preventive. Frequent examinations of the hive during the swarming season for the purpose of cutting out queen cells is a help, and requeening with young queens early in the season generally prevents swarming.



Robbing.—There are certain times during the season when no nectar is secreted by the flowers, will is during such periods as this that the bees will rob each other if they can. When sweets can be obtained in considerable quantity from a weak colony unable to defend itself, the bees are apt to become furious and their craze is not unlike that of gold hunters when gold is discovered in large quantities. There is a rush and when the sweets are suddenly cut off, the bees are inclined to be cross and to sting. The wise and careful bee-keeper will see to it that the entrances of his weak colonies are properly contracted so that the sentinels or quarts can protect themselves from intrusion from other bees.

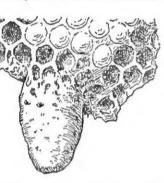
Feeding.—When bees are short of honey, sugar sirup may be substituted. This is feed to the bees in an inverted can with a kew small hole punched in the lid. This is placed on top of the colony and enclosed in the upper story of the behive. Feeding, at best, is a necessary cwil. It is always better to give bees combs of honey or better yet, a whole hive body of combs containing loney. Sugar sirup—two parts sugar, one part water—is not a natural food and should be used only when no sweet is available from the

field.

Transferring.—In increasing the aplary it is sometimes best to buy colonies in box hives on account of their smaller cost, and to transfer them to hives with movable frames. This should be done as soon as possible, for box-hive colonies are of small value as producers. The best time are of small value as producers. The best time is to transfer is in the spring, when the amount of honey and the population of the colony are at a minimum. Transferring need not be delayed until spring merely because that season is best for the work. It may be done at any time during the active season, but, whenever possible, during a honey flow, to prevent robbing.

Wintering.—During the winter it is often desirable to protect the lives with waterproof paper, with packing material between live and paper in cold climates. The entrances should be go contracted down to slut out as much cold as possible. In extremely cold climates the hives cold as possible. In extremely cold climates the hives.

apparently causes one individual a wo - and another to emerge egg stage the preadult r, queen, and male is respectively ys, and 24 days. The adult life the period of active nectar flow is x weeks; during the much more nditions it is six months or more.



of a comb of Apis mellifica, with ome of them capped, others open) and t royal cell. Natural size.

olerated in the hive until the ns sharply to dwindle. Then what is often referred to as he drones. It usually represents on of these indolent members d a frustration of their subsere-enter. As the drones are on the workers for food, exparental home is the equivalent death.

of its development a mellifica ceeds 70,000 bees. New hives swarming. The old queen dearm, and her successor in the ovided there is no afterswarm) st of the royal daughters to exodus of the swarm. To s princess often slays her royal are still imprisoned in their em forth and stinging them.

taking vperiments performed ch al ater supplemented by peen established that red and guishable to honeybees, that y with orange and green, and Blue-green they recognize as and yellow. Finally they see is invisible to man.

o established the fact that a

has confirmed that honeybees are able to orient themselves by the polarization of sky light,

Interesting as are the discoveries made thus far regarding bees, it is safe to predict that much of a rewarding character still awaits the enterprising student of their ways.

of a fewarding character still awaits the enterprising student of their ways.

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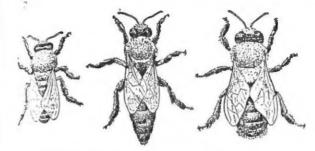
HERBERT F. SCHWARZ, Research Associate American Museum of Natural History, vol. 90, Feb. 16, 1948; Frisch, Karl von, Bees, Their Vision, Chemical Senses, and Language (Ithaca 1950).

HERBERT F. SCHWARZ. Research Associate, American Museum of Natural History.

BEE BIRDS, birds reputed to devour bees, especially the honeybee. Not many birds have this habit, the bees being protected against most birds by their stings. A few flycatching birds. however, have learned how to avoid being stung. and catch not only bees but wasps, take them to a perch and beat them, so as to kill them, and probably get rid of the sting before swallowing them. Notable among these are the European and African bee eaters (q.v.). The American kingbirds (q.v.) also catch bees, but not as frequently as is popularly supposed, and are known in the Southern states as bee martins.

BEE EATER, a small, richly plumaged and graceful bird of southern Europe and norther

age and mountain sage; in the North Central Eastern states, white, alsike, the new Ladino, eweet clover; in the South and West, orange, lo, palmetto, cats-claw, mesquite, and gua-



Left to right: worker; queen bee; drone.

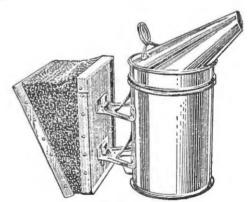
Most authorities agree that the honeybees' value lies in their ability to cross-pollinate and legume blossoms, and thus largely inuse the production of fruit and seed. Bees are possible for 80-85 per cent of all crop pollinaperformed by insects. With the increased of insecticides and more intensive cultivation the land, many wild insects have been derayed in recent years, leaving the important of pollination more and more to the honey-

To assist in pollination and to increase the unber of colonies, bees are shipped by the and from the South. In 1948 more than a Hion pounds of bees were shipped in two- and ree-pound cages without combs.

There are several species of bees-Apis doror the giant bee of India and the Philipbes: A. indica, of India; A. florca, and A. lifica. From a commercial standpoint, the mentioned is the most important. It comises the black bee of this country; the Italian rom the southern part of Italy; the Syrian of Palestine; the Cyprian, from the island Cyprus; the Carniolan, from Austria, and the measian from the Caucasus Mountains. But most important of all these varieties is the dian bee. They are the most industrious and gentlest. They, together with the black bees I their crosses, incorrectly termed "hybrids." he used most extensively in the United Statesfact, throughout much of the civilized world.

mother of the whole colony. The drones are incapable of gathering honey, and serve only one purpose-that of fertilizing or fecundating the young queens, which act takes place in the air. The workers gather all the honey and pollen. fill all the combs, and rear the young or baby bees. As soon as the mating season is over, the drones are allowed to starve.

How to Handle Bees .- There is a general impression that ordinary honeybees are vicious, ready to attack any one who comes near their hives. This is a great mistake. Under certain conditions, when their habits are known, they will permit one to tear their hives apart, rob them of their hard earnings-honey and the wax -without even offering to sting. But an inexperienced or awkward person may irritate them. To bring them into a state of subjection it is only necessary to blow smoke into the entrance and over the combs, at which time, if the motions about the hive are careful and deliberate, they will offer no attack. Smoke, when intelligently used, disarms opposition and puts the bees in a quiet state.



Bee-smoker.

The bee-smoker is simply a small bellows attached to a cylindrical stove having a nozzle from which the smoke is blown. Besides the beesmoker, the bee-keeper generally uses a bee-veil made of wire cloth. Gloves are sometimes used by timid persons or beginners, but as a general thing all work with the bees is performed with bare hands. Stings are, of course, occasionally received but beyond a sharp, momentary pain, no permanent effect will be felt after the first season for the bee-keeper very soon becomes immining an that me smalling value along



BEE-KEEPING

fertilized egg apparently causes one individual to develop into a worker and another to emerge as a queen. Including the egg stage the preadult life of a worker, queen, and male is respectively 21 days, 16 days, and 24 days. The adult life of a worker in the period of active nectar flow is about four to six weeks; during the much more static winter conditions it is six months or more.



Pragment of a comb of Apis mellifica, with worker cells (some of them capped, others open) and below a pendant royal cell. Natural size.

Drones are tolerated in the hive until the neutar flow begins sharply to dwindle. Then there takes place what is often referred to as the slaughter of the drones. It usually represents a foreible ejection of these inclorent members from the live and a frustration of their subsection.

quent efforts to re-enter. As the drones are largely dependent on the workers for food, exclusion from the parental home is the equivalent of starvation and death.

At the height of its development a mellifical colony rarely exceeds 70,000 bees. New irres are established by swarming. The old queen departs with the swarm, and her successor in the parental hive (provided there is no afterswarm) is usually the first of the royal daughters to the parental hive (provided there is no afterswarm) is usually the first of the royal daughters to be energy after the exodus of the swarm. To eliminate rivals this princess often slays her royal sisters while they are still imprisoned in their cells, dragging them forth and stinuing them. Through painstaking experiments performed by Karl von Frisch and later supplemented by Karl von Frisch and later supplemented by Karl von Frisch and later supplements and they confuse yellow with orange and green, and they confuse yellow with orange and green and they confuse yellow with orange and green, and they confuse yellow with orange and green, and they confuse yellow with orange and green, and they confuse the supply is near but, when it is distant 100 meters or more, the bec executes a wagging dance (so designated because the abunent is moved rapidly from side to side). The distance to the food supply because the direction of the so-called straight part of the wagging dance: if downward, then away from the sun. In response to these dances and aided by the floral seen of the source of the droplet of metar resurrelated from

white eggs.

has confirmed that honeybees are able to orient themselves by the polarization of sky light. Interesting as are the discoveries made that far regarding bees, it is sare to predict that much of a rewarding character still awaits the enerprising student of their ways.

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BEE BIRDS, birds reputed to devour bees, the especially the honeyhee. Not many birds have this habit, the bees being protected against most birds by their stings. A few flycatching birds, however, have learned how to avoid being stung, and catch not only bees but wasps, take them to a perch and beat them, so as to kill them, and probably get rid of the sting before swallowing them, Yotable among these are the European and African hee eaters (q,x). The American kingbirds (q,x) also eatch bees, but not as frequently as as popularly supposed, and are known in the Southern states as bee martins.

BEE EATER, a small richly plumaged and graceiul bird of southern Europe and northern Africa, whose food consists almost wholly of bees and wasps, and which hamts the useighborhood of the hives of honeyhees and devours these useful insects in great numbers. The bee eaters are related to the kingishers, and, like them, dig deep nesting-holes in carthen banks, and lay pure

BEE-KEEPING. Few persons who see the little hoxes of honey in the market realize the importance and extent of the bee-keeping industry of this country. According to the United States Department of Agriculture, over 200,000, 1000 pounds of honey are produced annually. When it is remembered that California alone, in he a good year, can produce 300 carloads of honey. When it is remembered that California alone, in he a good year, can produce 300 carloads of honey and that a good many of the other states produce and that a good many of the other states produce and that a good many of the other states produce of the commercial possibilities wrapped up in so small an insect as the bee.

The honey resources of the great West are the very largely dependent on affalfa, sweet clover,

runge and mountain sage; in the North Central all Eastern states, white, alsike, the new Ladino, all sweet clover; in the South and West, orange, und sweet clover; ocats-claw, mesquite, and guapelo, palmetto, cats-claw, mesquite, and



Most authorities agree that the honeybees' are value lies in their ability to eross-pollinate and aggune blossoms, and thus largely intrase the production of fruit and seed. Bees are espansible for 80-85 per cent of all troop pollinasin performed by insectis. With the increased of insecticides and more intensive cultivation the land, many wild insects have been described in recent years, leaving the impurtant of pollination more and more to the honey-

To assist in pollination and to increase the smaller of colonies, bees are shipped by the and iron the South. In 1948 more than a sulion pounds of bees were shipped in two- and arree-pound cages without combs.

There are several species of bees—Apis dorate, or the giant bee of India and the Philipped, and the Philipped, and the Apista. From a commercial standpoint, the smentioned is the most important. It compares the black hee of this country; the Iradian from the southern part of Italy; the Syrian of Palestine; the Cryptian, from the Syrian of Palestine; the Cryptian, from the island to typis; the Carnolant, from Austria, and the measian from the Gaucasus Mountains. But we may be the control of all these varieties is the rilian bee. They are the most industrious and the gentlest. They, together with the black bees and their crosses, incorrectly termed "hybrids," it used nost extensively in the United States—in act, throughout much of the civilized world.

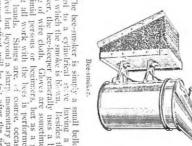


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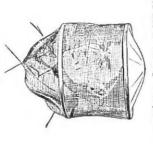
Three Kinds of Hive Bees.—There are tree kinds of bees in the live; namely, the uniters, or undeveloped inendes; the queen, a sly developed female; and the drone or the rade bee. The queen lays all the eggs of the live and may lay as many as 2,000 in a day. Notwithstanding there may be from 10,000 to 100,000 bees in a single colony, the queen will be the

drones are allowed to starve.

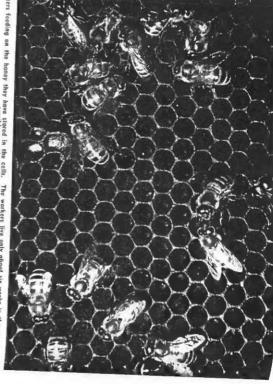
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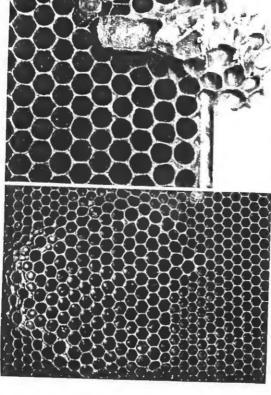
Marketable Products of the Hive.—These are beeswax, comb and extracted finney. Bees-



Workers feeding on the haney they have stored in the cells. The workers live only about six weeks in the warm season

@ Bernard L. Gluch

Lower left: The queen, or fertile femals, is langer and larger than the workers. The cell containing an cgg designated to became a queen is large and irregularly shaped and stratches over the face of the camb. Lower right: Drone cells built to hause worker larvae.



see annoying to human beings is their propenset to penetrate the hair. In Brazil they are
said torse cabellos (hair twisters) in consequerce. A name applied in Brazil to some of
the tmy bees of Trigona (Hypotrigona) is lambe
albes (eye lickers) because of their habit of
lapping moisture from the eye. Some stingless
kees render powerless insect enemies that intruvie in the nest by daubing them with sticky
material—perhaps honey—until they are glued
to death. This, curiously enough, is a method of
warriare practiced also by a bumblebee (Bombus
loradius). re-Columbian days, before the introduction in gractane and before the establishment in Western Hemisphere of the Old World worke, the stingless bees were the main research of those craving sweets. Columbus made againtance with the honey of these bees when the strong his first voyage he landed in Cula: in methoding Yucatan to this day there are flourning apiaries of Melipona beecheii.

The sting of these bees is atrophied and non-instituding that they have other means of delense, some resort to biting. Trigona (Ozytrigona) are of chemical warfare long antedating such warfare by man. What often makes stingless annoting to human before is their conservations. that rear

Singless bees stock the brood celts with food and atter an egg has been laid seal the cell after the manner of the solitary bees instead of enthe manner of the solitary bees instead of enthe bronzybees and bumblehees. Some stingless bees arrange their brood cells in irregular clusters of the honeybees and bumblehees. The wast without orientation and separate these cells in solitary the manner intervening pillars of wax. The wast had been intervening pillars of wax. The wast had been to been a solitary to the cells in combs. In the case of the honeybee, and the comb consists of a single layer of cells facing upward instead of a double row of cells facing upward instead of a double row of the standard base to hase as in columies of the malifica. Honey and pollen are stored by the standard base to the cells of a comb but in relatively large pots. Earthen materials, dung resin, leaf particles, and the like are used in nest-building besides the wax the bees secrete. Some especies are ground-nesting, others arboreal, especies are ground-nesting, others arboreal, the source of the colls erect their structures within the nests of termites. Others occupy the nests of ants; nests of affine strateus are particularly favored. A few instances are recorded of the use of birds' nests as places ing tube, spout, or trumpet-shaped formation advertising the presence of the nest. Some species

Edouard Drory, who in the 1870's tried to arclimatize stingless bees in Bordeaux, asserted that the male not only produced wax like the worker but also performed other tasks. These claims require verification notwithstanding the conscientious source from which they come.

at had conspicuous entrances. There is even come of bumblebees, Pathyrus, that, like the against best discussed in a previous paragraph, bependent on a host species for the rearing its young. In the case of Pathyrus the host prices is always a bumblebee. Pathyrus has no exist saturds at that rear the broad of the incoder. the brood of the invader.

The Honeybee (Apis mellifica).—Man's interest in the honeybee and its products is an ancient one. A rock painting in the Cueva de la Araia (Spider Cave) near Valenda, Spain, dating back to Paleolithic times, shows a honeygatherer climbing to a wild hive while the bees fly about menacingly.

A relief in the Temple of the Sun, built about 2600 n.c., indicates that at that remote date

of 2600 n.c., indicates that at that remote date so beckeeping was practiced by the Egyptians n-Techniques of apiculture which are sometimes of thought of as modern—for instance, the transfer of wintage of the nectar flow—were known in the Mile region as long ago as the 3d century ac. Aftir millifed has been introduced to many the property of the Western Hemisphere but originally it was a stranger to that half of the globe. It reached New England through the agency of man in the first part of the Jith century.

Several members of the genus Africaceur in the Indo-Malayan region. In addition to Africate the first part of the Jith century.

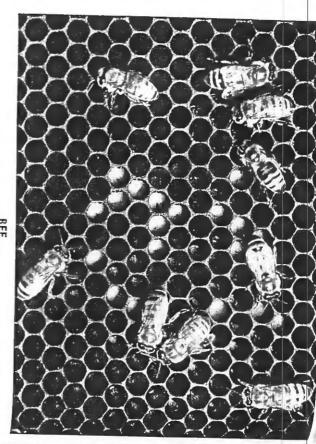
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Several members of the genus Africaceur in the Indo-Malayan region. In addition to Africaceur in the Indo-Malayan region. In the huge semicircus the property closely allied to millifen, there are the giant honeybee (Africaceur). In the huge semicircuse the indo-Malayan region in the towards suspended usually from the rest in diameter and suspended usually from the first that of a tree, the brood cells are of one size. This uniformity accords with the condition in the stratch of a tree, the brood cells are of one size. The thoughteen the subsequent life of several wars. Her egg-laying capacity is impressive, the stroughout her subsequent life of several end at the fall in the northern part of her range, to as many as 1500 to 2,000 per day at the peak of without the subsequent life of several wars. Her egg-laying capacity is impressive, the office of all in the northern part of her page, to as many as 1500 to 2,000 per day at the peak of without and the fall in the northern part of her page, to as many as 1500 to 2,000 per day at the peak of without the subsequent life of several wars. Her egg-laying capacity is impressive, the office of the propective worker, and drones but royal jelly continues to be the feed of a larva reared to be a queen. This diff



Fig. 8.—Rock painting at the Arafia (Spider) Cave, north-west of licorp, Valencia, Spain, showing an indi-vidual of the Stone Age gathering honey from a well defended hive. About half actual size.

Throughout the Apoidea the role of the male tends to be limited to the fertilization of the



White larvae of the honeybee, in various stages of growth, are shown here inside the cells of the comb structure.
They are still legicss and must be supplied with tood by the adults. Bernard L. Gluck

Below, worker bees drag ailing dranes and weekling or disabled workers out of the hive. One of the workers' many responsibilities is to maintain the productive efficiency of their caste.



cover left: The deek of male bee has no sting and does no work besides making with a new queen, whereupon he dies. Lawer right: Whotes quanted are stationed at each entrance to the hire is chase away bees from other hires coming to steal hancy. This guard personnel is constantly changing but always on the alert.



menaces the existence of the Colletidae. Now and then Nonnada, another inquiline genus of the Anthophoridae, lays its eggs in the nests of Eucera, belonging to the same family, but predominantly the victims are members of the genus Androna, type genus of the Andrendae. The nests of Panurgidae and Halictidae are also

Englossidae.—These bees are confined to the tropics of the New World and are insects of ingular brauty, with brilliant metallic reflections and sometimes with abdominal hair bands of contrasted coloration. Remarkable in this family contrasted coloration. Remarkable in this family is the tongue (glossi), which frequently exceeds the length of the insect itself and, carried exposed below the abdomen, extends often well beyond the anal extremity. Another structural distinction



7.—b. A male, natural size, of Euplasa briller, showing the full extent of the whighlike tonure, flanked by a, a short-tonured species, Collecter details (remails), and by c, offit mellifier (worker) with tonigue and associated month parts. The Collecte and the Afric twice natural size.

of these bees is the presence on the hind tibiae of the corbicula or pollen basket, which, alone among the solitary bees, Englossidae share with the three

exclusively social groups

of bees-

aditude and high latitude fauna, however, and altitude and high latitude fauna, however, and as a rule are absent from the tropical lowlands.

In the Old World they are well represented in the Carope and Asia and occur also along the Mediterranean fringe of North Africa, but the Salara literranean fringe of North Salara literranean from the Salara lit Meliponidae, and Apudae (here confined to the Meliponidae, and Apudae) (here confined to the genus Apida). The last three are also characterized by their ability to produce wax. Apidae produce it ventrally on the abdonem. Meliponidae dorsally, and Bombidae both ventrally and dorsally, The wax is used in cell construction.

Bumblebees (Bombidae).—There are hundreds of kinds of bumblebees. Representatives of the family are found from Greenland and Alaska in the Far North to the southern tip of South America. Bumblebees are essentially a high altitude and high latitude jamas, however, and

Among the differences between bumblebee Among the differences between bumblebee zolonies on the one hand, and colonies of the honey-bee and of stringless lees on the other, is that, while the latter establish themselves by swarming, the humblebee nest is usually founded by a single individual—the queen—who in addition to her activities in egg-laying openges initially also in foraging so as to provide sustemance for the brood that emerges from the eggs. The ability of the bumblebee queen not only jo lay eggs but

itself but a substitute for an electric fan.
Even when a bumblebee queen after diffgent search has taken passession of a nest site, her reign may be disputed. Intruding queens sometimes kill and replace the legitimate founder of a colony. Otto Emil Path found on several occasions as many as eight or ten dead queens in nests

brood that emerges from the eggs. The ability of the humblebee queen not only to lay eggs but also to gather nectar and noticen after the manner

w of the females of the solitary bees is due to fact that structurally she is scarcely different in thated from her cospecific worker. She is provided with a corbicula (on which the moistered pollen load is carried home) comparable to the of the worker. The honeybee queen and the stingless bee queens, on the other hand, have the conditional conditional conditions with extensive structural modification that they are no longer capable of field activities and in the economy of the hive are restricted to egg-laying.

egg-laying.

Colonies of the honeybee and of the stingles bees are percential and some of them survive our many years, with new broods of workers taking the place of those that have completed their rather brief life span. The queen continues a coulive successive broods of her worker daughters. On the other hand, in the case of the bamblelees (with the exception, it would seen of some species of the tropics) the colonies are amunal affairs and although the old queen enjoy the longest span of life, she too, like the worker and the males, dies at the end of the annual cycle. The recently energed young queens after copulation hilbernate, frequently in the soil, and in the spring each establishes inthe course of the year.

Bumblehees usually nest in or on the ground. The vacated nest of a small manmal—fieldmouse clipmunk, vole, or the like—is apt to be favored. Here the overwintered young queen establishes her honeypot and constructs the waxen egg cell that is to produce the first brood of workers. The queen, in addition to providing the food for her first brood, inculates this progeny, probably furnishing needed warmth.

Some bumblebees flashion one or more pockets of wax at the side of each mass of developing he larvae and into these pockets drop their load of pollen on which the larvae feed. To such best F. W. L. Sladen gave the name of pocket-mikers. Other humblebees store their provisions in cells detached from the bunches of larvae and these Sladen designated pollen-stores. Vacated the cocoons are frequently used for the storage of honey but certain species construct waxen homey had post as well. Sladen noted that the honey in these waxen pots was thin, while that in the no cocoons was dense, and drew the conclusion that the former was for daily consumption, the latter reserved for periods of scarcity. As the first broods mature, new brood cells are constructed near the top of the cocoons and thus the colours wavenumber.

the colony expands.

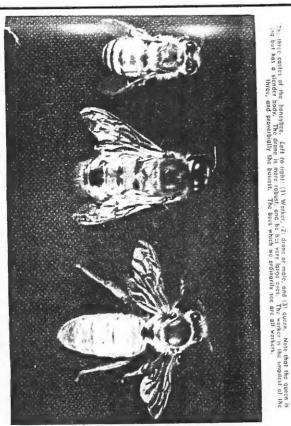
One of the persistent myths that crops up from time to time in connection with bumblehees is that a particular bee, designated the trumpeter, sounds reveille for the live by humming as she tans her wings from a cantage point on the next. It is true that an individual like or even several bees may vibrate their wings in this manner and give off sounds, but the phenomenon may occur at any time, whether morning or evening, and the humming is merely incliental to an act that is concerned with the ventilation of the next. The act is not a hugtle call to the colony to bestire.

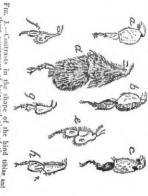


BEE

trains in the life cycle of the hencybee. Left to right: (1) Egg. (2) young larva, (3) mature larva, (4) a white bupa niwing the health of adult legs and antennee and darkening of the eyes; (5) a puga in which the adult has become the control of the property of the cycle of the

College Photographs by Couries E. By ... From American Social Innorthing for Couries 2. Observed and Company H. Micheles. 1931; D. Von Kontrolla Company. 1935.





queen, of greater longevity than her progeny, shares the nest with her descendants, which, if a of the worker caste, take over many of the singular property of the construction of the bandeloc are capable of laying eggs that a develop into males and, in queenless colonies, will resort to such expedients, the queen is habitularly the sole ovipositing member of the community. Instances of a social setup are lound among the Halictidae and in the genus Allodape of the Ceramidae but the bees that particularly exemplify the social state are those belonging to the families Bombidae. Meliponidae, and Apidae. So closely related are the last three that Charles Duncan Michener, a penetrating student of the Englossidae of solitary labit but of related structure, tribes of the subfamily Apinae.

Primitive Bees.—Let us first turn our attention to the solitary bees as above defined. The most primitive bees are those belonging to the family Prosopidae (Hylacidae). As a general rule bees tend to be hairy but in the Prosopidae the body pubescence is of scanty development and a special apparatus for pollen-collecting is lacking. Also low in the scale of development are metabrishes of the foreign of a primitive her (Potacolletts - start) in foreign of a primitive her (Potacolletts - start) in foreign of a primitive her (Potacolletts - start) in foreign in the matterns
through fells ordine, adherent obstructive particles
may be removed. And and waps in well as leads
including the honey her, possess this neithel as leads
ture, b. Expanded and ornamented hards boilts of
the foreign of a male of Monablik latinumum, s. The
corresponding founds in a male of Monablik following.
All of the same enlargement.

Fig. 3.—Contrasts in the shape of the hind tible and their cupiment of hairs and also of the social mentatura and small tarsal joints. It is on the slid less that these bees hear to their rost the pollen hade, a student as heliumbi (female, pollen haden), a student as the contrast of the student of the st

bees of the iamily Colletidae. These bees are much more bairy, but their admity with Prosopidae is indicated by the structure of their forque iglossa), which like that of Prosopidae is short and usually truncate or emarginate apically. Both of these groups have in common an interesting method of nest building. Most solitary liess use alien material for the construction of their cells but these primitive bees employ a secretion of their own, probably saliva, for the purpose. Both families are widely represented the world over. From Australia alone more than 100 species of Prosopis (I lyberas) have been described. The Colletidae, too, are abundant and diversified in that continent but the type genus Colletia, well represented elsewhere, does not occur there. Among the interesting Neotropical represents the interesting Neotropical represents and Philosophesia. Carpenter Bees.—The small carpenter bees (Carpenter) and the large carpenter bees of (Nylcopolidae) share certain structural characteristics. Both groups tunnel in wood to establish the their nests. Coratinidae choose as their nest sins sumae, naspberry, and other Rubus plants into the pith of which they tunnel. Nylcopolidae or prefer wood of more solid substance and sometimes inflict dunnate on wooden structures ereated by man. Bees of the genus Cratinu spend the winter in small communal assemblies consisting got both males and females and it has been se chained that the males assist in the preparation of the winter quarters—one of the very few instances among the bees where the male bee has allegedly a role other than tertilization of the female. Cratinu is the only genus of small carbon the control of the winter parters—one of the very few instances among the bees where the male bee has allegedly a role other than tertilization of the female. Cratinu is the only genus of small carbon the control of the control of the control of the parter of the warmer regions. Rather spheres but favor the warmer regions. Rather stricking sexual dichromatism is exemplified in some of the Xylcopolidae, the termales being black the males tawny. A peculiar structural characteristic known as the "interpolect" is located in the first abdominal segment of the female of certain of female mites of the genus Disinganuments.

female mites of the genus Dissiparaments.

Various Families—Fideliidae is an African family of somewhat disputed affiliation. V. P. Propov placed them among the lower families of bees. Their mouth parts and thoracic configuration induced Charles Duncan Michener to place them among the higher bees. Heinrich Frieds and Haus Bischoff pointed out that Fidelia is

ropeis, and Agalysicius menuire than compensate through their brilliant metallic green coloration for relative unpretentiousness of size. Most bees are diurnal, collecting pollon and nectar while the sun is up, but among Halictidae is a genus of the New World tropies. Menalopha that makes its floral visits at night. Halictidae, like some

Halictidae and Andrenidae.—Halictidae fire for the most part small bees or bees of intermediate length but many of them—especially those velonging to the genera. Jugochlora, Jugochlorafas, and Andreacher-more than compensate

conewhat intermediate in pollen-collecting habits exween the Megachilidae and the leg-gathering cles, although structurally in belongs in the creation of the leg-gathering cles, although structurally in belongs in the creation of the leg-gathering and Macrophisate excur in various parts the world but only three genera—Meilita, the world but only three genera—Meilita, the world but only three genera—Meilita, in the other continents. A straila, are present in the other continents. A worth American genus of this family is an intensive study. Also a member of this lands in the moctumal bee that T. D. A. Cockerell rillied as Xerophama, which like the nighting Megadopha, noctumal Maullid wasps, and and of the Vespidae, is equipped with unfally large ocelli, organs which are present layers mear the top of the head in addition to be brever commound were on the sides of the larger compound eyes on the sides of the

Anthophoridae.—This is a large group, well executed throughout the world but many of the resented throughout the world but many of the read are confined to the New World, Well-win genera of large inclusion are Anthophory, ordenia, Melissader, and Henitide Gormerly, rotenia, Males of the South American Thyra and also of Tetrahout and Melissader are spaceous because of their very long antennae.



—Mide lees usually have longer antennac than co-weaking females and sometimes their antennac in movement of characters that replier them distill measure of the following makes show structures of Twanter species. In Proceedings of the International bombiferants. It Replies collaboration of the same enhancement.

and of this family have their mandibles placed and of the posterior markin of the eye. An aboridae are frequently groundnessing and rain species of Anthopiners both in the Old and the New extend ouward their nest trance in an embankment by constructing a wn-curving chimneylike projection. Somewhat uparable structures are fishioned by wasps of

Leaf-cutters and Their Relatives (Megachidae),—With the exception of the Prosopial all of the families thus far considered the main carry their lead of pollen on the relative main carry their lead of pollen on the relative main carry their lead of this method of monoration are sometimes referred to as bliggidae (leg-gatherers). In contrast a very resting family. Megachilidae, collect pollen on the hind legs but on the underside of the bunch, which is provided with a courtal brash retaining the pollen grains. Bees thus imped are sometimes referred to as Gastrible (abdonen-gatherers). Megachilidae are aree group. The type genus. Megachilidae are



nen of Megachile bee. b, Abdomen of such a bee pollen-haden.

mhers considerably more than a thousand dif-rent forms the world over. Most of the con-

stituent species construct their thimble-shaped geells of leaf particles—oval pieces for the sides and round ones to plug up the top of a cell. These the femde bee cuts with great precision, with her mandibles as she sits astride a teaf, toung leaves are favored and a plant that is used as a quarry can at once he recognized by the geometric excisions made along the margins of its leaves. More rarely the petals of flowers are used and still more rarely hirehark. Members of the genus Oznita—bees of metallic blue appearance—often separate the cells of their nest with partitions of clay or of chewed-up leaves or material gathered from the nest hollow. Some Oznita, especially the earth-dwelling forms, line in their cells with petals of flowers. Poppies are favored by the European Oznita lanoa and Oznita particularly. Several species select for their nest the empty shells of land snails. Among the most interesting of these is Oznita bircilor, which as a completing technique of nest-making, covers the helix shell containing her prospective brood with a scaffolding of pine needles, to which are added particles of moss and the like until the nest is well conceiled. Resinous cells are constructed by Phanthilium while members of the closely related genus Antifulium nea woolly plant material that they scrape, with mandibles anally supplied with teeth, from suitable plants. To the Megachilishae belong also the masson bees (Chalicodoma).

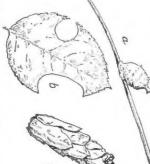


Fig. 6.—a. A resinous cell of Aubhibilium notation in a pine media. b. Rose and from which a library media. b. Rose and from which a librarial level has supped particles for the construction of its new last. Closely united cells of such a nest. All natural size.

Inquiline Bees.—Bees are beset by many senemics, some of them members of their own y suborder. There are many genera of bees that, a structurally ill-provided for foracing, eschew in the species by laxing their eggs on the provisions intended for the offstring of the host. These intended for the offstring of the host. These intended for the offstring of the host. These intended for the substraint of those of the European cuckoo and the American cowbird, are in some cases relatives of the bees they impose upon. Thus among the Megachilidae, just considered, there are generallike Cocliarys, Diarrys, Strifs, Chelynia, and others that victiminate industrious genera of their family. Similarly the Tricycolus oviposits in uests of Melizodez although both aggressor and victim have been figured in the same tamily (Anthophoridae). In contrast, Excelus, a close relative of Tricycolus.

ment, for Bedford, Mid Division, South Division, and the borough of Luton. Pop. (1951) county,

ilterature, Bédier was responsible for a new theory of the development of the chansons de geste of the Middle Ages. Their growth, he said, was a development of tales fostered along the great pilgrim routes in 11th century France. His criticism was based entirely upon extant manuscripts, not, as before, upon critical intuition and allowance for error in manuscripts. His La Fornation des légendes (1908–1913) first set forth his theories of the development of meditival French literature as against the old theories of evolutionary development. French author and medieval scholar: b. Paris, June 28, 1864; d. Grand Serre, in the depart-ment of Drome, Aug. 30, 1938. Considered one of the leading authorities of French medieval BEDIER, bā-dyā', Charles Marie Joseph

BEDIVERE, bědř-věr, Sír, in Arthurian legend, one of King Arthur's most trusted knights, It was Sir Bedivere who cast the sword Excalibur into the lake and carried the dying Arthur to the vessel in which he was borne away to Avalon,

BEDLAM, běďiăm, a corruption of Bethlehem. as applied to Saint Mary of Bethlehem, the name of a religious foundation granted in 1247 by Henry VIII to the corporation of London, and by them applied as early as 1472 to the purpose of a hospital for the insane. The place was originally within the city boundaries, but in 1815, a new building was erected in Lambeth, on the right side of the Thames, and was vulgarly called Bedlam. The patients, who had been discharged partially cured and went about begging, were called bedlam beggars or Tom o' Bedlams. The word bedlam has become a colloquialism to describe any place of noise and confusion. BEDLAM, bčďílám, a

BEDLINGTON TERRIERS. See Ten-

an urban district. England, in Northumberland, on the river Blyth, five miles southeast of Moropeth. It is an important coal-mining center and has brick works and agricultural development. It is also famous for its terriers. The Church of St. Cuthbert, of Norman architecture, is a landmark and was one of the traditional resting places of the body of the saint. Pop. (1951)

BEDLOE'S, běd'lôz, or LIBERTY ISLAND, an island in New York harbor. It was acquired by New York in 1738 and was cycled to the United States government around 1800. It became the site of Fort Wood in 1841, and is now the location of Frederic A. Bartholdi's colossal statue of Liberty Enlightening the World, better known to Americaus as the Statue of Libserty, presented by France to the United States in 1885. The island became a national monument

BEDMAR, būth-mār', Manques ne (At-pox-50 nr 1.1. Ctex/1) Spanish politician and car-dinal: b, 1572; d, Oyicho, Aug. 2, 1655. He was sent in 1607 by Philip III as ambassador to Ven-

n, ice, and rendered himself famous by the ear, spiracy against the Venetian Republic in 168 in which Abbe de Saint-Real lass so well described in his Conjurcation des Espagnoles contre Venetia (1674). Notwithstanding the circumstantiality with which the details are given by Saint-Real last very existence of the conspiracy is still control of the conspiracy is still control of the very existence of the conspiracy is still control of the very existence of the conspiracy is still control of the very existence of the conspiracy is still control of the very existence of the conspiracy is still control of the very existence of the conspiracy is still control of the very existence of the conspiracy was been determined by many a very difficult historical probability is that the conspiracy was treat, but that the Venetian Senate, satisfied with a long there with Spain, did not willing to break the language of the language of the language of the language of the same historical of Flanders (1622), and the received a cardinal's hat from the latter in the same year. same year.

an BEDOUIN, běďóo-ín or běďóo-ên (Arab obědáví, dweller in the desert), the name given to the nomadic Arab as distinguished from the coastal or residential Arab, called Fellahin. The Bedouins inhabit the deserts of Arabia, northern Africa, and Syria, where they live in tents made of goat's hair, and exist almost solely on the produce of their herds of camels, sleep, and goats of goat's hair, and exist almost solely on the produce of their herds of camels, sleep, and goats and. Their life is spent in a constant round of new a fierce and warlike people, Bedouins retain the Arabic features and customs in their purest form. Lack of communications with the outside, more civilized world has made them an independ, and and proud people, scorning modern were

ent and proud people, scorning modern ways.

They are of a cheerful and courteous temperament, especially when entertaining guests under their own roof, but to make an enemy of one is to expect cruelty and treachery at any moment. Great importance is attached to a family's general, ogy and strict rules are set to prevent one of the purest ancestry from marrying one of dubious

: cutaneous disorders.

Be ancestry.

Horses and camels are raised in great numbers, although the horse is used only for riding and racing, and wealth is measured by the number of camels one has. This, in turn, depends on the endurance and speed of the pure bred horses when raiding other tribes for more camels. The Redouints are Mohammedans, though of a greatly simplified and somewhat pagan sort. The head of the tribe is called the shelk and although primageniture is not generally followed the rule usually stays in a single family. See also ARARIA—The People.

BEDSORE (also Pressure Sore, Decurrus Ulcer), a local necrosis of the skin and subdicutaneous tissue, generally occurring on the posterior surface of a portion of the body which has been subjected to pressure. Long-continued pressure from splints, plaster dressings, and the mitidicious use of hot-water bottles in cases of unconscious or paralyzed patients are also occasionally escent in the skin over though prominences such as the pelvis, sacrum, crest of the limm, the prominences of the ankle, and the heel. Pressure which excludes the arterial blood supply to the tissue will lead, if continued, to recrosis and gangrene. Early signs of a developing bedsore in a nonparalyzed patient are burning sensations and local pain. If the case is seen

removal of the pressure and gentle massage prevent necrosis. The use of alcohol and a prevent necrosis. The use of alcohol and the powder is also useful. If cared for early limit powder is also useful. If no old cases nuch sloughing and secondary infection, a nuch sloughing and secondary infection, a

ucemia may develop.
HAROLD WELLINGTON JONES, M.D.,
Mor Director, Army Medical Library; Editor,
Stakiston's "New Gould Medical Dictionary."

BEDSTRAW or GALIUM, a genus of a 20 annual or percunial herbs with four-id stems, of the family Rubiaceae, natives and the temperate climates in the northern ship of the temperate climates in the northern ship of the temperate climates in the northern ship of profuse white, yellow green, or the blossoms, which in some species are used therists to add lightness to bouquets of heavy wers and to cover rockeries. The two weigs most cultivated for this purpose are molituge, sometimes wrongly called "baby's cath," and G. boreale. Yellow bedstraw (G. 1914), a species with yellow flowers, yields a claw dye when boiled in alum solutions, and roots yield a red dye, said to rival maddrosts yield a red dye, said to rival maddrosts yield a red dye, faid to rival maddrosts yield a red dye, faid to rival maddrosts yield a red made in England. The fait is also used in curdling milk. This species together with G. trifidum and G. boreale, been the bones and milk of animals that eath of the bones and milk of animals that eath with a substitute for coffee. It is not for the hooked prickles of its stems, and for the hooked prickles of its stems, and for forter the hooked prickles of the stems, it is in the forter of the stance. G. mollings and G. rightium, we been tried in cases of epilepsy and others

BEE. All bees belong to the suborder Aproidea, which in turn is a division of the order Inneuroptera. Other well known insects placed in different suborders of the Hymensontera are the sawflies and the so-called ichneumon files (both of which, notwithstanding their popular than the so-called incomplete the so-called incompl

in different suborders of the Hymeisopiera are the sawfiles and the so-called chineumon flies (but of which, notwithstanding their popular ame, are wasps), the ants, the social wasps that tailed paper nests, the gall-making wasps, the paper nests, the gall-making wasps, the paper nests, the gall-making wasps, the state of the paper nests, the gall-making wasps, the paper nests, the paper nests with the paper nests, the paper nests, the paper nests, the paper nests with the second wasps, and others. Desired wasps, which provision their nests with secretary in some instances, with spiders, bees are partial to pollen and nectar (or nectur rewritten and the spiecoid wasps as a group are associated with this divergence in food habits. The bees are provided with branched hairs for the rectarion of pollen during their floral visits whereas simple hairs suffice the sphecoid wasps in the pursuit of their prey. In the bee the meetaars, particularly the meetaars i of the third pair of legs, are widened. Thus a larger surface is provided the essential brushes on the inner face of the essential brushes on the inner face of the essential brushes on the muscles for regularization nectar.

Abundance of Species and Subspecies—

The list of bees published in the Catalogus

Hymenopterorum, vol. 10 (1896) of Karl Wil-helm von Dalla Torre included the names of and bibliographical references to more than 6,000 kinds. In the subsequent half century a single melitrologist, albeit an exceptionally productive one, Theodore Dru Alison Cockerell, described more than 5,000 additional new forms. Many other melitologists in lesser degree have extended the known apifauma of the world and annually there are accretions to the total of species.

In view of these evidences of an extensive bee
fauma, the estimate that Heinrich Friese-himself
a describer of many species—made when he
placed the different kinds of bees at 20,000 is

d petitors in minuteness among the members of the Australian genus Turner/da. At the other externe are such giants of the bee world as Megachile plate, 38mm, long, from Batjan (Bachian). East Indies, the huge queen of a South American bumblebee. Bombus dailbomii, which sometimes has a length of more than 30 mm, and the portly members of Xylocopidae or large carpenter bees. a describer of many species—made when he a describer of many species—and when he placed the different kinds of bees at 20,000 is probably to be regarded as conservative.

Contrasts in Size—In the vast aggregate that the bees constitute there are differences of a structure, of coloration, and of size. Trigonal (Hypotrigona) duckei of the American tropics, of the referred to as the smallest of the bees, is so tiny that the species was described from a specimen that lodged in the eye of an entomologist, and the describer expressed doubt whether a collecting net was fine enough to hold it. This a collecting net was fine enough to hold it. This dwarf, only about 2mm. in length, has com-



Fig. 1.—The dwarf species of the bees, Tripona duckei (worker), compared with a rigantic bumblebee queen (Bontbus dakthonis), both natural size.

sustat to think of bees and Social.—It is not unusual to think of bees as prevailingly social heterates the best known bees fall within that cate, gory. Yet it has been estimated by William Morion Wheeler that only about five per cent of the species live in culonies. All of the rest are solitary in labit. In the case of the solitary in labit, in the case of the solitary hees a single fertilized fenule constructs her nest independently, cell by cell, stocking each cell with pollen (sometimes mixed with nectar) of her own gathering, lays an egg on this provenender, seals the cell thus supplied before provenender, seals the cell thus supplied before provenender, seals the nest is completed closes it and finally after the nest is completed closes it and finally after the nest is completed closes it and finally after the nest is completed closes it and finally after the states of the next cell, and finally entered to a cell, so through their successive instars or moults, pupate, and finally the same life history as their mother. In this scheme of things the parent never becomes acquainted with her offspring.

By way of contrast, in the social bees the